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09/965,545	09/27/2001	Frederick M. Discenzo	01AB121	3887

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Alexander M. Gerasimow, Esq.
Rockwell Automation
(Allen-Bradley Co., Inc.)
1201 South Second Street
Milwaukee, WI 53204

EXAMINER

PEREZ DAPLE, AARON C

ART UNIT	PAPER NUMBER
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2121

DATE MAILED: 11/03/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/965,545

Applicant(s)

DISCENZO ET AL.

Examiner

Aaron C Perez-Daple

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5,7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Oath/Declaration

1. The prior application number 09/163,933 claimed under 35 USC §119 was filed September 29, 1998. The date should be corrected.

Claim Objections

2. **Claim 19** is objected to because of the following informalities: line 2 recites “means form” where it should recite --means for--.
3. **Claim 36** is objected to because of the following informalities: line 6 of claim 36 recites “one sensed attribute and/or the diagnosed state” where it should recite --one sensed attribute, the diagnosed state, or both--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an

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international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. **Claims 1-3, 10, 18-24, 27-30, 35 and 36** are rejected under 35 U.S.C. 102(b) as being anticipated by Gotou et al (US 4,933,834) (hereinafter Gotou).
6. As for claims 1 and 19, Gotou discloses a method and means for controlling a motorized system comprising:
 - measuring an attribute of the motorized system [col. 1, line 59-col. 2, line 3, "...position sensing means...the sensed signal...."];
 - diagnosing a health of the motorized system based on the measured attribute [col. 2, lines 4-9, "...error signal producing...a specified amount...."];
 - providing a diagnostics signal based on the diagnosed health [col. 2, lines 4-9, "...error signal producing...a specified amount...."]; and
 - providing a control signal based on the diagnosed health [col. 2, lines 43-46, "...control signal producing...the memorized values...."].
7. As for claims 2 and 20, Gotou discloses the method of claim 1 and the system of claim 19, further comprising operating the motorized system according to the diagnostics signal [col. 1, line 55 – col. 2, line 50, "These objects are...to the control signal."].
8. As for claim 3, Gotou discloses the method of claim 1, further comprising modifying a setpoint of the motorized system [col. 4, lines 3-11, "Thus, a control loop...at a target value (a target speed)."].

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9. As for claim 10, Gotou discloses the method of claim 1, wherein measuring the attribute comprises measuring a speed of the motorized system [speed detector 12B, Fig. 1].
10. As for claim 18, Gotou discloses the method of claim 1, wherein measuring the attribute comprises receiving measurements from at least one sensor [sensors 12A and 12B, Fig. 1].
11. As for claim 21, Gotou discloses the control system of claim 19, further comprising:
means for modifying operation of the motorized system based on the control signal
[driver 11B, Fig. 1].
12. As for claim 22, Gotou discloses a system comprising:
a motorized system [controlled system 11, Fig. 1];
a communications link coupled to the motorized system [inherent for transfer of control
signal and sensed signals, Fig. 1]; and
a control system coupled to the communications link comprising [controlling block 13
and detecting block 12, Fig. 1]:
a controller coupled to the communications link adapted to operate the motorized
system in a controller fashion [microprocessor 13A, Fig. 1]; and
a diagnostics system coupled to the communications link adapted to diagnose the
health of the motorized system according to at least one measured attribute associate with
the motorized system [error signal producing means, col. 1, line 55 – col. 2, line 50,
“These objects are...to the control signal.”].
13. As for claim 23, Gotou discloses the system of claim 22, wherein the at least measured
attribute comprises at least one of vibration, pressure, speed, and temperature [speed detector,
Fig. 1].

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14. As for claim 24, Gotou discloses the system of claim 22, wherein the motorized system comprises components, devices, subsystems and process controls [Fig. 1].
15. As for claim 27, Gotou discloses the system of claim 24, wherein the diagnostics system provides a diagnostics signal [error signal, col. 2, lines 4-9, "...error signal producing...a specified amount...."], and wherein the controller provides a control signal [col. 2, lines 43-46, "...control signal producing...the memorized values...."].
16. As for claim 28, Gotou discloses the system of claim 27, wherein the diagnostics signal represents health of the motorized system and the control signal represents control information for the motorized system [col. 1, line 55 – col. 2, line 50, "These objects are...to the control signal."].
17. As for claim 29, Gotou discloses the system of claim 24, wherein the controller provides a control signal, wherein the control signal contains control information for controlling at least one of the components, the devices, the subsystems and the process controls [col. 2, lines 43-50, "...control signal producing...to the control signal."].
18. As for claim 30, Gotou discloses the system of claim 22, further comprising at least one sensor coupled to the motorized system and the communications link for measuring the at least one measured attribute [sensors 12A and 12B, Fig. 1].
19. As for claim 35, Gotou discloses the system of claim 22, wherein the control system is implemented on a computer system [microprocessor 13A, Fig. 1].
20. As for claim 36, Gotou discloses a system to facilitate controlling a motorized system, comprising:

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at least one sensor that senses at least one attribute of the motorized system [sensors 12A and 12B, Fig. 1];

a diagnostics system that diagnosis a state of the motorized system based at least in part on the at least one sensed attribute [controlling block 13 and detecting block 12, Fig. 1; col. 1, line 55 – col. 2, line 50, “These objects are...to the control signal.”];

a prognostic system that makes a prognosis of the motorized system based at least in part on the at least one sensed attribute and/or the diagnosed state [controlling block 13, Fig. 1; col. 1, line 55 – col. 2, line 50, “These objects are...to the control signal.”]; and

a controller that controls the motorized system based at least in part on the diagnosed state [microprocessor 13A, Fig. 1; col. 2, lines 43-46, “...control signal producing...the memorized values....”].

21. **Claims 1, 19-21 and 36-38, 40 and 41** are rejected under 35 U.S.C. 102(e) as being anticipated by Madhavan (US 6,004,017).

22. As for claims 1 and 19, Madhavan discloses a method and means for controlling a motorized system comprising:

measuring an attribute of the motorized system [col. 2, lines 39-42, “The method includes...changes in the function.”];

diagnosing a health of the motorized system based on the measured attribute [col. 2, lines 39-42, “The method includes...changes in the function.”];

providing a diagnostics signal based on the diagnosed health [col. 2, lines 42-46, “The method also...limit cycle oscillations.”]; and

providing a control signal based on the diagnosed health [col. 2, lines 47-52, "Still further in...on the classifier signal."].

23. As for claim 20, Madhavan discloses the control system of claim 19, further comprising:
means for modifying operation of the motorized system based on the diagnostic signal
[col. 2, lines 37-52, "In carrying out the above...on the classifier signal."].

24. As for claim 21, Madhavan discloses the control system of claim 19, further comprising:
means for modifying operation of the motorized system based on the control signal [col.
2, lines 37-52, "In carrying out the above...on the classifier signal."].

25. As for claim 36, Madhavan discloses a system to facilitate controlling a motorized
system, comprising:

at least one sensor that senses at least one attribute of the motorized system [col. 1, lines
56-58, "The presence and...appropriately placed accelerometers."];

a diagnostics system that diagnosis a state of the motorized system based at least in part
on the at least one sensed attribute [col. 2, lines 38-46, "In carrying out...limit cycle
oscillations."];

a prognostic system that makes a prognosis of the motorized system based at least in part
on the at least one sensed attribute and/or the diagnosed state [col. 2, lines 38-46, "In
carrying out...limit cycle oscillations."]; and

a controller that controls the motorized system based at least in part on the diagnosed
state [col. 2, lines 47-52, "Still further in...the classifier signal."].

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26. As for claim 37, Madhavan discloses the system of claim 36, the controller controlling the motorized system based at least in part on the prognosis [col. 2, lines 38-46, "In carrying out...limit cycle oscillations."].
27. As for claim 38, Madhavan discloses the system of claim 37, the controller automatically adjusting operation of the motorized system based at least in part on the prognosed future states of the motorized system [col. 2, lines 38-46, "In carrying out...limit cycle oscillations."].
28. As for claim 40, Madhavan discloses the system of claim 36, the prognostic system inferring future operating states of the motorized system [col. 2, lines 22-31, "Still another object...the present invention."].
29. As for claim 41, Gotou discloses the system of claim 36, the controller automatically adjusting an operating state of the motorized system based at least in part on the prognosis [col. 2, lines 38-46, "In carrying out...limit cycle oscillations."].
30. **Claims 19-21** are rejected under 35 U.S.C. 102(b) as being anticipated by Grayson et al (US 5,111,531).
31. As for claim 19, Grayson discloses a control system for controlling a motorized system comprising:
- means for measuring an attribute of the motorized system [col. 6, lines 58-68, "The configuration function...set forth in Table 1."];
 - means for diagnosing a health of the motorized system [col. 2, line 52 – col. 3, line 47, "Briefly, according to...to the process database."];

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means for providing a control signal [col. 2, line 52 – col. 3, line 47, “Briefly, according to...to the process database.”]; and

means for providing a diagnostic signal [col. 2, line 52 – col. 3, line 47, “Briefly, according to...to the process database.”].

32. As for claim 20, Grayson discloses the control system of claim 19, further comprising:

means for modifying operation of the motorized system based on the diagnostic signal [col. 2, line 52 – col. 3, line 47, “Briefly, according to...to the process database.”].

33. As for claim 21, Grayson discloses the control system of claim 19, further comprising:

means for modifying operation of the motorized system based on the control signal [col. 2, line 52 – col. 3, line 47, “Briefly, according to...to the process database.”].

Claim Rejections - 35 USC § 103

34. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35. **Claims 4-9, 12-14, 25, 26 and 42** are rejected under 35 U.S.C. 103(a) as being

unpatentable over Gotou (US 4,933,834) in view of Hays et al (US 6,260,004) (hereinafter Hays).

36. As for claims 4, 5 and 9, although Gotou discloses detecting a frequency of the motorized system [col. 3, lines 25-47, “A detecting block 12...with reference to Fig. 2.”], Gotou does not specifically disclose obtaining and analyzing a frequency spectrum of the measured

attribute. However, Hays teaches obtaining and analyzing a frequency spectrum of a measured attribute in a motorized system [col. 1, line 66 – col. 2, line 14, “Rotating machines and pumps...the CSI Application paper.”].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Gotou by obtaining and analyzing a frequency spectrum of the measured attribute in order to detect and correct conditions that may lead to damage of the motorized system, as taught by Hays [col. 2, lines 47-55, “Traditional condition monitoring...pump performance signature.”].

37. As for claims 6-8, although obvious to one of ordinary skill in the art, Gotou does not specifically disclose the method of claim 1 wherein the motorized system comprises a motorized pump nor a fan. However, Hays discloses a method similar to claim 1 which includes measuring an attribute associated with the motorized system which may comprise a motorized pump, a fan, turbine, compressor, blower, or other motorized device [col. 8, lines 37-40, “The method of the...blowers and pumps.”].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Gotou by measuring an attribute associated with the motorized system which may comprise a motorized pump, a fan, turbine, compressor, blower, or other motorized device, in order to detect and correct conditions that may lead to damage of these system, as taught by Hays [col. 2, lines 47-55, “Traditional condition monitoring...pump performance signature.”].

38. As for claim 12, Gotou does not specifically disclose the method of claim 1, wherein diagnosing the health comprises analyzing an amplitude of a first spectral component of a

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frequency spectrum at a first frequency. However Hays teaches a method similar to claim 1, wherein diagnosing the health comprises analyzing an amplitude of a first spectral component of a frequency spectrum at a first frequency [col. 1, line 66 – col. 2, line 14, “Rotating machines and pumps...the CSI Application paper.”].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Gotou by analyzing an amplitude of a first spectral component of a frequency spectrum at a first frequency in order to detect and correct conditions that may lead to damage of the motorized system, as taught by Hays [col. 2, lines 47-55, “Traditional condition monitoring...pump performance signature.”].

39. As for claims 13 and 14, Gotou does not specifically disclose the method of claim 1 wherein providing the control signal comprises providing the control signal to increase or reduce cavitation. However, Hays teaches providing a control signal to increase or reduce cavitation in order to optimize pump performance [col. 8, lines 37-48, “The method of the...normal wear and tear.”; col. 9, lines 27-34, “Hosts capable of using...to drive the pump.”]

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Gotou by providing a control signal to increase or reduce cavitation in order to optimize the performance of a motorized pump, as taught by Hays [col. 8, lines 37-48, “The method of the...normal wear and tear.”; col. 9, lines 27-34, “Hosts capable of using...to drive the pump.”].

40. As for claim 25, Gotou does not specifically disclose the system of claim 24, wherein the components comprise bearings, the devices comprise a motor, pump and fan, the subsystems

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comprise a motor drive-pump and process controls comprise a pump fluid control. Hays discloses a system similar to claim 25, wherein the components comprise bearings, the devices comprise a motor, pump and fan, the subsystems comprise a motor drive-pump and process controls comprise a pump fluid control [Fig. 1]. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Gotou such that the components comprise bearings, the devices comprise a motor, pump and fan, the subsystems comprise a motor drive-pump and process controls comprise a pump fluid control in order to provide a diagnostic system for a motorized pump assembly, as taught by Hays [col. 8, lines 37-43, "The method of...head centrifugal pumps."].

41. As for claim 26, Gotou discloses a motorized system comprising a load [load 11C, Fig. 1], however Gotou does not specifically disclose that the load comprises at least one of a valve, a pump, a conveyor roller, a fan, a compressor, and a gearbox. Hays discloses a system similar to claim 22, wherein the motorized system comprises a motor and a load, and wherein the load comprises at least one of a valve, a pump, a conveyor roller, a fan, a compressor, and a gearbox [Fig. 1; col. 8, lines 37-43, "The method of...head centrifugal pumps."]. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Gotou such that the load comprises at least one of a valve, a pump, a conveyor roller, a fan, a compressor, and a gearbox in order to provide a diagnostic system for a motorized pump assembly, as taught by Hays [col. 8, lines 37-43, "The method of...head centrifugal pumps."].

42. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over Gotou. As for claim 11, Gotou does not specifically teach measuring a temperature of the motorized

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system. "Official Notice" is taken that both the concept and advantages of measuring a temperature of a motorized system are well known and expected in the art. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Gotou by measuring a temperature of the motorized system in order to detect operating conditions such as overheating.

43. **Claims 15-17 and 31-34** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gotou in view of Edison et al (US 5,586,305) (hereinafter Edison). As for claims 15-17 and 31-34, Gotou does not specifically disclose transmitting signals via a wireless network. Edison teaches a transmitting signals over a wireless or other remote network in a distributed control system [col. 8, lines 48-65, "Fig. 8 is a...wireless or IR link."]. It would have been obvious to one of ordinary skill in the art to modify Gotou such that the communication link comprises a wireless network and further to transmit one or more signals, including the control and diagnostic signals, via the wireless network, in order to control the process from a remote location, as taught by Edison [col. 8, lines 48-65, "Fig. 8 is a...wireless or IR link."].
44. **Claim 39** is rejected under 35 U.S.C. 103(a) as being unpatentable over Madhavan (US 6,004,017) in view of Grayson et al (US 5,111,531) (hereinafter Grayson). Madhavan does not specifically disclose the prognostic system comprising a non-linear training system. However, Grayson teaches a control system similar to claim 36, wherein the prognostic system comprises a non-linear training system [col. 3, lines 15-23, "The trainable neural...a teaching algorithm."]

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Madhavan by using a prognostic system comprising a non-linear training system in order to predict and control at least one indirect process variable, as taught by Grayson [col. 2, line 52 – col. 3, line 2, “Briefly, according to this...indirectly controlled variable.”].

45. **Claim 42** is rejected under 35 U.S.C. 103(a) as being unpatentable over Madhavan in view of Hays. As for claim 42, Madhavan does not specifically disclose the controller scheduling preventive maintenance for the motorized system based at least in part on the prognosis. Hays teaches the controller scheduling preventive maintenance for the motorized system based at least in part on the prognosis [col. 2, lines 47-55, “Traditional condition monitoring...pump performance signature.”]. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Madhavan by scheduling preventive maintenance for the motorized system based at least in part on the prognosis in order to prevent damage to the system, as taught by Hays [col. 2, lines 47-55, “Traditional condition monitoring...pump performance signature.”].

Conclusion

46. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 6,002,232, note Fig. 2 and vibration analysis; US 5,859,774, note Fig. 1; US 6,584,430, note recommended error correction; US 6,294,891, note vibration suppression; US 5,313,399, note adaptive vibration suppression; US 6,029,095, note dynamic control; US 6,192,325, note predictive maintenance; US 5,442,555, note Fig. 1; US 5,659,667, note adaptive control with neural networks; US 5,841,651, note Fig. 1; US 5,940,291, note


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wireless network; US 5,282,261, note neural network process control; US 6,014,612, note remote network; US 5,121,467, note neural network and expert system; US 6,445,959, note remote network; US 5,043,862, note Fig. 1; US 5,349,541, note neural network predictive system.

47. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron C Perez-Daple whose telephone number is (703)305-4897. The examiner can normally be reached on 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anil Khatri can be reached on (703)305-0282. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

 10/21/03
Aaron Perez-Daple


Wilbert L. Starks, Jr.
Primary Examiner
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